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ABSTRACT

This paper describes the first-year results of Distributive Information Systems for Campuses (DISC), a project implemented in the Austin Independent School District (Texas). The goal was to increase the data access and information-generating capabilities of campuses by decentralizing data manipulation functions, while maintaining centralized data processing of major applications. A second project goal was to redesign student, school, and district profiles by consolidating reports into a single, comprehensive report, creating a permanent, online data file. Major outcomes include: (1) design and creation of a new school profile; (2) resolution of a number of issues involving the creation of a large data file and printing a profile report; (3) implementation of an individual student profile; and (4) provision of some simple applications to schools. Additional progress needs to be made in the areas of providing campus staff training, increasing the hardware on campus, identifying software that campuses can use, and arranging for support personnel. Five figures are included. Attachments include sample profiles, specifications, and a file format for Megafile. (LMI)

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DISTRIBUTIVE INFORMATION SYSTEMS FOR CAMPUSES (DISC): GOING WHERE NO PROFILE HAS GONE BEFORE

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ABSTRACT

Distributive Information Systems for Campuses (DISC) is a project of the Department of Management Information (DMI) of the Austin Independent School District, Austin, Texas. The goal of the project is to increase the data access and information-generating capabilities of campuses by decentralizing data manipulation functions, while maintaining centralized data processing of major applications. To attain this goal, DISC is attempting to "distribute" access and analysis capabilities to campuses so that they may use more fully the extensive information available on the mainframe computer. Distributive information systems means that campuses could create desired reports more quickly, could customize them to meet their own needs, and would not need to rely so much on central processing facilities. In effect, DISC is about "moving data to the campuses."

Moving data to the campuses means providing campuses with data resident on the mainframe computer in a form which they can manipulate. In the broadest sense, this effort will require the identification of appropriate training for staff, hardware, software, and support personnel. More immediately, simple applications to furnish to campuses can be identified—e.g., student/parent addresses for directories/ mailings and already-formatted data files with software to query them.

As a transitional stage to campuses creating their own custom reports, a second goal of DISC was to redesign student, school, and district profiles by consolidating a number of current reports into a single, comprehensive report and, in the process, creating a permanent, on-line data file which would be the basis for all future profiles. In the future, schools will be able to query downloaded portions of this file.

An interdisciplinary team from DMI, including staff from the Office of Research and Evaluation (ORE), Data Services, and Data Processing/Interface, worked cooperatively to address the goals of the project. Other DMI staff served in an advisory capacity to the team. Overall direction and allocation of priorities and resources were furnished by the Executive Director of DMI.

Major findings are summarized below:

1. In the first year of the DISC project, a new school profile was designed and produced. This profile consolidated information from, and replaced, several other profiles, including the District's annual performance report. The profile was provided to campuses in early March for campus planning and other purposes.

2. In the process of producing the school profile, a considerable number of issues involved in creating a very large data file and printing a profile report were resolved.

3. An individual student profile, which merges the concepts of local file access and electronic transfer of data, was implemented in fall 1992.

4. Some simple applications—student/parent addresses for directories/mailings and already-formatted data files for campus data bases—were furnished to schools.

5. Additional progress needs to be made in the areas of providing training for campus staff, increasing the hardware on campus, identifying software campuses can use, and arranging for support personnel.

DISTRIBUTIVE INFORMATION SYSTEMS FOR CAMPUSES (DISC): GOING WHERE NO PROFILE HAS GONE BEFORE

INTRODUCTION

Statement of the Problem

Campuses need school-level information for many purposes—planning instruction, conducting inservice training, writing grant applications, and, especially, devising campus improvement plans (CIP's). Ideally, campuses should have access to and the means to manipulate data customarily collected and stored on a central computer. Typically, however, large school districts produce and disseminate to campuses school "profiles" which are intended to report all of the information campuses need. The consequence of this central production of profiles is a double-bind situation. At the district level, considerable resources that could be directed toward other district priorities are tied up in creating profiles. Campuses, for their part, are dependent on central processing facilities which, no matter how comprehensive the effort, inevitably cannot produce all of the custom information they require when they need it. This paper discusses the first-year results of a project to shift away from centralized data production to school-based data self-sufficiency.

Review of the Literature

A profile, as defined by Broadfoot (1986) is a "method of displaying the results of an assessment; it is not a method of assessment. It is essentially derived from a separation of the whole of an assessment into its main parts or components." Profiles have been used in the field of education for a number of years. In public school education, interest in the use of profiles arose in part from a dissatisfaction with relying solely on test results as a description of a particular student's success in school. The profile format provided a way to describe a wider range of student, as well as campus and district, success, which included test results and other related and important elements that are not overtly reflected in test scores, such as attendance rates, or enrollment in advanced courses. It was also thought that student, campus, and district profiles could provide practical feedback to help motivate and guide principals, teachers, and students through the academic process.

Profiles in education take many forms, but it is generally agreed by those in the field (see Withers, 1986) that, to be useful, profiles should:

- Summarize performance,
- Report academic as well as nonacademic outcomes,
- Highlight more than one element or objective,
- Contain important identifying information, such as student name, school year, course names or numbers, etc.
- Provide up-to-date information.

Other features of useful profiles are:

- Elements or objectives are not amenable to aggregation or averaging, and
- Letters and numbers are reported with an explanatory key which gives meaning to codes, such as course numbers or letter grades, or other terms used.

Withers (1986) offers the caveat that profiles should not intrude on the personal privacy of a student, or misrepresent, confuse, or fail to explain any assessment information.

In sum, profiles provide a format for organizing large amounts of data into a concise, easy-to-read description which gives a comprehensive picture of the subject, whether an individual student, a school, or a school district.

The widespread use of computers in education has aided the profile process by providing a means to compile and consolidate student and other relevant data more efficiently. This paper reports the first-year results from an intensive project to use computer technology to create comprehensive individual student, school, and district profiles and to look beyond profiles toward campus-based information systems.

Perspective

During the 1991-92 school year, staff of the Department of Management Information (DMI) of the Austin Independent School District (AISD), Austin, Texas, several times expressed a sentiment to the effect that "we want to get out of the profile business." The meaning of this remark is at the heart of the DISC project this report describes, a project which reflects in AISD the types of changes which have been occurring in major business

organizations throughout the 1980s. Getting out of the "profile business" means, most immediately, the central management information systems (MIS) department ceasing to produce statistical profiles of schools to send to campus personnel. Profiles, though intended to convey useful and often requested information, amount in the aggregate to huge, expensive volumes of information, which are then sometimes infrequently used. In a larger sense, getting out of the profile business means shifting away from centralized data processing to distributive information systems, that is, moving from centrally located people using a large mainframe computer to produce information for personnel at geographically dispersed sites to the users at those sites using their own computers to manipulate available data bases and produce information they want.

Background

DISC, and the philosophy it embodies, did not spring up overnight. In 1991-92, a districtwide school-based improvement (SBI) initiative added impetus to a movement which had already been underway in the District for some time, that of automating certain processes ("applications" in data processing terms) to make them more efficient. For example, many personnel processes in AISD have been automated, some for many years (Wilkinson, 1990). To date, the automation of applications in AISD has occurred centrally on the mainframe computer, though District campuses have benefitted both directly and indirectly by the automation. In addition, campuses have in recent years been able to access a wide range of student and administrative data on the mainframe computer. On the whole, campuses have not, however, had the capability for manipulating these data to customize them for their local needs. Campus personnel have had to rely on the speed and availability of the central processing facilities to provide them with custom information. Consistent with a school-based management philosophy, the next step in the automation process was therefore evident.

In data processing parlance, "distributive processing" refers to decentralized data processing, where data manipulation functions are "distributed" to remote (i.e., noncentral) locations. Distributive information systems implies that access to and analysis of data are decentralized. The aim of the DISC project is to "distribute" access and analysis capabilities to campuses, so that they may use more fully the extensive information available on the mainframe computer, while maintaining centralized data processing of major applications. Distributive information systems means that campuses could create desired reports more quickly, could customize them to meet their own needs, and would not need to rely so much on central processing facilities, including having to travel from their campuses to the central office to pick up computer output.

Goals of the Project

The two goals of the DISC project are:

1. To redesign student, school, program, and districtwide profiles; and
2. To increase data access and analysis capabilities at the campuses.

"Profiles" refers here to a number of current reports which present data at various times of the year and with various definitions of the data being reported. In AISD, these include:

- Academic Excellence Indicator System (AEIS)
- Achievement Profile
- Annual Performance Report (APR)
- Effective Schools Standards Report
- GENESYS (GENeric Evaluation SYStem)
- Secondary Profile
- School Characteristics and Ranks (SCAR)
- Vital Signs

A short description of each of these profiles is presented in Attachment 1.

Such an array of reports pointed to the need to compare and contrast them and perhaps to merge them into a single, comprehensive report, while at the same time making provisions for new reporting requirements relating to Texas Education Agency (TEA) accreditation, Project A+ (a partnership project with IBM), and campus improvement plans (CIP's). In fact, this consolidation effort was one of the first activities undertaken by the DISC team (see below), and it will be described fully later in this report.

Moving data to the campuses means providing campuses with data resident on the mainframe computer in a form which they can manipulate. In the broadest sense, this effort requires:

- Identification of appropriate training for staff,
- Hardware,
- Software, and
- Support personnel.

More immediately, simple applications to furnish to campuses could be identified—e.g., student/parent addresses for directories/mailings and already-formatted data files with software to query them.

First-Year Objectives of the Project

The first-year objectives of the DISC project were to:

- Increase data access at the campuses,
- Identify software campuses can use,
- Redesign profiles,
- Redesign applications: surveys, mailings, etc., and
- Consider other issues: schools' use of AISD's data entry bid, CIP's, etc.

The DISC project is not:

- A data processing application effort such as grade reporting, payroll, attendance accounting, etc.,
- An SBI-dependent effort,
- Mainframe operations,
- Dependent upon additional budget requirements,
- Reducing the central quality control of data,
- Decentralizing data processing, or
- "Dumping" work onto campuses.

The DISC Team

During the 1991-92 school year, an interdisciplinary team from the District's Department of Management Information (DMI), which includes both the Office of Research and Evaluation (ORE) and Data Services, worked cooperatively to address the goals and objectives of the project. The team members and the approximate percentages of their time allocated to the project are shown below.

These percentages take into account that the work of the team would accomplish much of the traditional work of these positions—just in a somewhat different manner.

Evaluator, Systemwide Evaluation (team leader)	25%
Evaluator, Systemwide Testing	15%
Evaluation Associate, Systemwide Evaluation	25%
Evaluation Associate, Systemwide Evaluation	75%
Supervisor of Programming	15%
Management Information Associate	15%

The Chapter 1 evaluator and the two half-time Project A+ evaluation associates served in an advisory capacity to the team. Overall direction and allocation of priorities and resources were furnished by the executive director of DMI.

Advisory Groups

To help to focus on the needs of campuses, the DISC team sought advice and review of its work from a number of existing advisory bodies:

- Data Processing Advisory Committee for Elementary,
- Data Processing Advisory Committee for Secondary,
- Advisory Principals' Team - Elementary
- Quick Response Team - Secondary
- Information Services Committee (ISC), and
- Evaluation Advisory Committee (EAC).

REDESIGNING PROFILES

School Profile

Rationale

Ironically, perhaps even paradoxically, the first step toward distributive information systems for campuses was the central production of a new and better school profile. Campuses' need for the information was evident in many requests, through many channels, for school-level information to fulfill many purposes—instructional planning, inservice training, completing grant applications, and devising campus improvement plans.

For example, in an administrative letter (August 14, 1991) the Assistant Superintendent for Secondary Education stated that "all CIP outcomes will be published in the Annual Performance Report," a simple statement belying the complicated production of a great deal of information!

Against the reality of campus needs, however, was the recognition of the simple fact that the campuses do not yet have the technical capability or the training to create their own reports. This fact made it necessary to continue to produce a profile centrally, until such time that campuses could be given the means and be taught to produce their own profile information.

The necessity of producing a profile centrally was, however, accompanied by the opportunity for bringing more coherence to the profile-making process. Over the years, ORE and DMI have created many different reports and reporting systems for conveying profile information to campuses and other audiences. See "Goals of the Project" above and also Attachment 1. Because much the same information is generally in demand, the content of these profiles overlapped and, because they reported data from various times of the year and with various definitions of the data being reported, the different profiles sometimes left users confused as to which number was the "official" statistic for the District. Although a system to document the "periodicity" of the data reported (Frazer, 1989) had evolved to describe the various reports of student information according to when they were produced and from what sources, it was time consuming to keep up and little understood outside DMI. One goal of the DISC project from the outset, therefore, was to redesign school and District profiles to consolidate all of the information being reported in different ways into a single, comprehensive report.

Merely having a better profile was not the end result desired, however, because the goal of distributive information systems remained. More than just making a better mousetrap, DISC needed to make mousetraps obsolete—by creating an on-line file which would become the basis for future updates and queries. Thus was Megafile born—about which more will be said later.

In summary, to the DISC team, producing profiles is clearly seen as a *short-term, temporary* expedient, transitional to end users (campuses) being able to develop their own reports. This perspective crystallized in meetings of the DISC team in the fall of 1991.

Designing the Profile

On October 1, 1991, the DISC team and advisors met in a day-long meeting with the objective of having, by the end of the day, a handwritten draft of the format of the pages of the new Profile. The day-long meeting was itself an innovation, an experiment to determine if a group of people, used to functioning relatively autonomously could, if isolated from the usual distractions and interruptions and charged with a specific, time-governed goal, work cooperatively to achieve that goal before returning to other activities. The "experiment" was a success.

Success was ensured, in part, because several previous meetings in September had laid the groundwork for this new Profile. In fact, the whole concept of a profile was reexamined in terms of what information would be needed, by when, and how that information would be made available. Four options for making necessary information available were considered:

Options:

1. Separate profiles, each with a publication date
2. Single profile with a single publication date when all data are available
3. Single profile with cells completed as data become available—whenever profile is printed, available data are entered, other cells blank
4. On-line profile (same as 2 or 3)

Option 1 represented the status quo. The individual reports being produced would contain the profile information available at the time, and certain information would be available in the fall, other information in the spring. The drawback to this approach is that the "official" statistics for the District would never be in one place. Even with a system documenting the periodicity of the various reports (Frazer, 1989), confusion over which statistic to cite from which report would likely persist.

Option 2 was the annual performance report (APR) option. Under State mandate, the District had been successfully producing APR's for several years, but a once-a-year report did not satisfy ongoing needs for the latest information, and by the time the report was published, it was in many ways an "historical" document, a record of the status of the District which was already out of date.

Option 3 seemed a promising alternative to the problems with *the first two options.* "Official" numbers would be recorded when they were available, in a single place, and when printed, the profile would contain the most current data. In fact, DMI had such a system in place, SCAR (see Attachment 1), but it had been lately left untended, partly because it was structured around rankings, a concept from which the District was distancing itself.

Option 4 was similar to the options 2 and 3, but it would feature an on-line file, available for viewing at any time. It seemed the most powerful and flexible option, but it would also be the most difficult to implement.

In selecting among these options, team members found it useful to distinguish among levels of information (see below). Printing a profile, it was recognized, addressed only the first level of information.

Levels of Information:

- APR/on-line file (District/school information)
- Class
- Student

Information at the class or student level, the team concluded, would need to be created by the individual campus. Thus, the inadequacy of profiles for the whole range of campus needs and the necessity to move to distributive information systems was reaffirmed.

The medium through which the profile information would be promulgated was discussed.

Possible Media:

- Hard copy
- On line interactive
- CD
- Diskette
- Download on line (snapshot)
- Hot line

Although the other possibilities were intriguing, the team members decided that in view of the current technical capabilities of the campuses, and to have a permanent, historical record, a hard copy of the profile needed to be printed. The other formats are to be explored in the future. An on-line, interactive file is the next, logical outgrowth of the profile production process, but technical problems relating to the size of the file need to be worked out.

Once it was determined to go forward with a printed profile, while deferring an on-line profile, general guidelines for what the profile should contain were formulated.

General Guidelines:

- Disaggregate—extra lines/columns or separate pages for each subgroup.
- Think of statistics not on any current profile.
- Give numbers and percentages.
- Give a two-, three-, or five-year historical perspective.
- Compare each campus to district totals.

Features of the Profile were defined.

Features:

- Available on request
- Most current data
- Meaningful and useful to somebody (as many as possible)
- Disaggregate by:

School	Chapter 1	Ethnicity
Class	LEP	Grade Spans
Individual	Income	Gifted/Talented
Grade	Sex	

- Positively stated—e.g., not retained
- Glossary, index, table of contents, definitions, formulas, examples
- Appropriate comparisons/valid rankings

The team decided that not everything could be included in a single report. The level of detail and the mammoth size of the resulting report rendered that course infeasible. Some intact, stand-alone profiles would continue to be necessary, for example, the achievement profiles (Mangino, Rodgers, Wiser, & Meyer, 1991), which present achievement data disaggregated by school, by grade, by test area, and by ethnic group.

The format in which the Profile would be printed was discussed, and a hierarchy by which the reporting would be structured was formulated.

Format (hierarchy):	**Example:**
Area	Progress toward graduation
Indicator	Dropout rate
Subindicator	Annual rate
Group	High school students
Subgroup	Grade 9
Statistic	Number/percent

Several other important format decisions were made:

- Forget the number of pages, i.e., not be concerned with how long each school profile became or how voluminous the final product was.
- Drop rankings, i.e., not rank campuses according to statistics such as dropout rate, etc.

These decisions provided the foundation for the October 1 meeting, at which the format of the Profile was drafted. Each school's profile was divided into four major sections:

1. School Description,
2. Student Information,
3. Staff Information, and
4. Finance Information.

Within each section, data would be arranged according to the hierarchy described above. The team decided that, wherever possible, all indicators should be disaggregated by ethnicity (Hispanic, Black, Other), sex, income, and grade level, and that as many years of data as possible would be printed.

Some time was spent in discussion of the issue of comparison group statistics. The guiding principle the team developed was that the information presented in a school profile should be information for that school only, that comparison statistics should be expressed as a difference from the school—reflected through the school lens, as it were. Application of this principle means that comparative District, state, and national statistics would not be printed, only the school's differences from them.

Outside Review

In the process of designing the new Profile, the question of outside input arose. Essentially, the question was whether future users of the profile, most notably school principals, should be involved in helping to draft the profile. The executive director demurred from this line of thinking, arguing that the desires of users had long since been expressed, and that past experience had indicated that users found designing profiles more difficult than editing them. He also noted that DMI knew something about producing profiles since the previous year's APR had received national recognition as best statistical profile from Division H of the American Educational Research Association (Ligon, Jackson, & Read, 1990). Hence, it was decided to proceed and to solicit review from knowledgeable, even critical, users once the Profile had been drafted.

To this end, a group of principals was invited to attend a meeting on October 25, 1991, to review and react to a draft format for the Profile. Selected elementary, middle school, and high school principals were invited.

Subsequent review was provided by the:

- Evaluation Advisory Committee (10/28/91),
- Director of Special Technology Programs (11/12/91),
- Information Services Committee (ISC) (11/15/91),
- Assistant Superintendent for Elementary Education and the Director of Elementary School Services and Special Programs (12/2/91), and
- Assistant Superintendent for Secondary Education (12/3/91).

The comments of each group of reviewers were recorded and reflected on a facing page of each succeeding draft of the format for the Profile. Review was largely completed by December 1991, and the attention of the DISC team turned toward production of the Profile by the end of February 1992.

Printing the Profile

Meetings of the DISC team and others in January 1992 firmed up details of the Profile's production. One important decision had to do with how the Profile would be printed. Four options were initially considered:

1. AISD programmers writing print statements,
2. A Data Services staff member creating templates for a laser printer,
3. Contracting with an outside vendor to create laser templates, and
4. Printing into an "exploded" format.

Besides the tried-and-true technique of having programmers write programs to print out the output, several other innovative approaches were considered as print options. The second option, which was an extension of a procedure already used with the first page of the most current APR and with pages of the GENESYS report (see Attachment 1), *involved creating "templates" into which data would be printed, much like typing onto an already-printed form.* The advantage of templates is their attractiveness. Templates in use in other reports utilize varied font sizes, shading, reverse fonts, and other design features which enhance the readability and the "look" of reports. The disadvantage of templates is that a special Xerox programming language is required to create them, and only one AISD staff member is trained in the language. Given the size of the task and the burden on one individual—dozens of pages were projected—*AISD could have contracted with a commercial vendor to create the templates*, but cost (in the thousands) was a deterrent to selecting this option.

Another option considered was using the mainframe laser printer to print onto 11 x 17 inch paper. This option was attractive because it resolved the difficulty of printing a great many numbers close together on a page. If a template were used, the printing tolerance sometimes would be very fine. Printing into an "exploded" format would afford a wider margin for error. Reduced, 8 1/2 x 11 inch copies could then be made of the printed, ledger-sized pages. One disagreeable facet of this approach was the amount of paper handling that would be required to transform the oversized pages into standard output.

A fifth option was put forward which *involved the use of a Macintosh PC to create the profile pages.* Data would be downloaded from mainframe files and funneled through the PC, which would send the pages to a laser printer to be printed. Downloaded data would be stored in the hard disk of the PC. The advantage of this option is essentially the power and versatility of desktop publishing—the profile pages could be designed to be very attractive. The main disadvantage of this approach had to do with the limitations of the PC and of the printer. Because of the large number of data fields (potentially several thousand per page) to be stored and retrieved, the speed with which the microcomputer's CPU could respond would be unacceptably slow. A related problem was the printing time involved. Because each page could take minutes to be assembled and printed, and thousands of pages were to be printed (at about eight pages per minute), printing through a PC constituted a major bottleneck. The time factor and other, unresolved technical questions, such as what software would be needed to create the interface, rendered this option infeasible.

In the end, option 1 was selected, to have programmers write print statements dictating the printing of the output, and printing 8 1/2 x 11 inch pages using the mainframe laser printer.

Megafile

Several other decisions were made in January meetings which had important consequences for creating the Profile. One of the most significant was the decision to create a single disk file containing all of the data needed to print the Profile. This file, termed Megafile, was to become the permanent, on-line file envisioned as the basis for all future profiles, centrally generated at first, later by schools querying downloaded portions of the file. It was dubbed Megafile in humorous tribute to an earlier longitudinal database, Big File, whose size would be eclipsed by the new, hence "mega," file. Although size is relative depending on the computer system, at one point Megafile had grown so

large that one segment (containing records of test scores) required more than 32,000 kilobytes of storage space, which exceeded the capability of the system's utilities to handle it. The segment was pared down to a size the utilities could handle by leaving out a year for which there were as yet no data, but this was a short-term solution which left the problem to be resolved at a future date. At completion of the Profile, Megafile was allocated 12,768,000 bytes and was stored on 27 cylinders.

A copy of the Megafile file format is Attachment 2.

Population versus Group Percentage

In a DISC team meeting on January 8, 1992, a decision was made which had some rather bothersome, though ultimately productive, consequences for producing the Profile. The decision was that *the percentage for "all students" would be 100% and that percentages within subgroups would sum to 100;* in other words, for a given indicator, the percentages of males and females would add up to 100, likewise the percentages of Hispanic, Black, and Other students, the percentages of 9th, 10th, 11th, and 12th graders in high school, etc. The subgroup "low income" was an apparent exception because the percentage of low-income students could be less than 100, but the rule did in fact apply, because even though the counterpart to low income, "not low income," would not be printed, the two categories if added together would sum to 100.

This ostensibly logical decision soon proved troublesome far beyond its apparent importance. *One difficulty lay in the comparison with the District,* in the "diff. from Dist." statistic. When the subgroup statistic for the District was subtracted from the corresponding statistic for a school, the resulting difference was sometimes very peculiar. On inspection, what became evident was that the school and the District statistics were not really comparable. What was going on might be described as a kind of "range" problem—on a given indicator, the District has more "range" than the school; that is, the District's distribution is based on all the students in the District rather than on the smaller number of students at the school. This range differential is particularly evident when

Figure 1
Example of Population Percentage

To calculate the ethnicity % and the difference from the district, use the following method:
Example: Hispanic Students Retained-Actual/Fall

Anderson High School

	90-91			91-92		
Retained-Actual /Fall	**#**	**Pop %**	**Diff. from Dist.**	**#**	**%**	**Diff. from Dist.**
All Students	168	100	0	4321	60	-99
Hispanic	93	55	9	4321	60	-99
Black	4321	60	99	4321	60	-99
Other	4321	60	99	4321	60	-99
Male	4321	60	99	4321	60	-99
Female	4321	60	99	4321	60	-99
Low Income	4321	60	99	4321	60	-99
Grade PK	4321	60	99	4321	60	-99
Grade K	4321	60	99	4321	60	-99
Grade 1	4321	60	99	4321	60	-99
Grade 2	4321	60	99	4321	60	-99
Grade 3	4321	60	99	4321	60	-99
Grade 4	4321	60	99	4321	60	-99
Grade 5	4321	60	99	4321	60	-99
Grade 6	4321	60	99	4321	60	-99
Grade 7	4321	60	99	4321	60	-99
Grade 8	4321	60	99	4321	60	-99
Grade 9	4321	60	99	4321	60	-99
Grade 10	4321	60	99	4321	60	-99
Grade 11	4321	60	99	4321	60	-99
Grade 12	4321	60	99	4321	60	-99

# of Anderson Hispanics Retained-Actual / **# of Anderson Students Retained-Actual** = % of Anderson Hispanics Retained Actual (%A)

93/168 = 55%

# of District Hispanics Retained-Actual / **# of District Students Retained-Actual** = % of District Hispanics Retained-Actual(%B)

1323/2851 = 46%

Difference from District = %A-%B

12

comparing percentages by grade level. Because District percentages are distributed across 14 grade levels, grades prekindergarten (pre-K) through 12, and school percentages were distributed across eight grade levels, grades pre-K through 6, *at most* (four at the high school level), the comparison at a given grade level is likely to be unequal. In effect, the magnitude of the difference between school and District statistics was dictated by the range, rather than by the respective shapes of the District's and school's distributions on the indicator. Even for subgroups where the number of subgroup elements was the same (e.g., ethnicity), the District's distribution could differ greatly from the distribution at the school.

In a sense the comparison was really one of the respective demographics of the school and the District. For example, on the indicator of student discipline, in a school whose student body was made up largely of Hispanics, the difference from the District could be a large negative number, suggesting incorrectly that the Hispanic students in the school were disciplined at a much higher rate than in the District as a whole, rather than that the percentage of Hispanics at the school was much larger than in the District, and therefore the number of Hispanic students available to be disciplined in the school is higher than in the District.

Another difficulty had to do with the meaning of the statistics. What did it mean, on the indicator of student retention, for example, if 40% of the students who were retained were Hispanic? A more meaningful statistic for most users of the Profile would be the percentage of the Hispanic students who were retained. It became evident that the root of the difference between these two statistics was which number was selected as the divisor. If division was by "all students" rather than by the number of students in the subgroup, then subgroup statistics are a proportion of the population under consideration (and percentages sum to 100). On the other hand, if division is by the number of students in the group under consideration, subgroup percentages do not sum to 100. By way of explaining and formalizing the distinction between these statistics, the terms **population percentage** and **group percentage**, respectively, were adduced.

Figure 2
Example of Group Percentage

To calculate the ethnicity % and the difference from the district, use the following method:
Example: Hispanic Students Not Disciplined

Anderson High School

Students Not Disciplined	90-91 #	90-91 Grp %	90-91 Diff. from Dist.	91-92 #	91-92 %	91-92 Diff. from Dist.
All Students	168	100	0	4321	60	-99
Hispanic	93	55	9	4321	60	-99
Black	4321	60	99	4321	60	-99
Other	4321	60	99	4321	60	-99
Male	4321	60	99	4321	60	-99
Female	4321	60	99	4321	60	-99
Low Income	4321	60	99	4321	60	-99
Grade PK	4321	60	99	4321	60	-99
Grade K	4321	60	99	4321	60	-99
Grade 1	4321	60	99	4321	60	-99
Grade 2	4321	60	99	4321	60	-99
Grade 3	4321	60	99	4321	60	-99
Grade 4	4321	60	99	4321	60	-99
Grade 5	4321	60	99	4321	60	-99
Grade 6	4321	60	99	4321	60	-99
Grade 7	4321	60	99	4321	60	-99
Grade 8	4321	60	99	4321	60	-99
Grade 9	4321	60	99	4321	60	-99
Grade 10	4321	60	99	4321	60	-99
Grade 11	4321	60	99	4321	60	-99
Grade 12	4321	60	99	4321	60	-99

# of Anderson Hispanics Not Disciplined / **# of Hispanic Anderson Students** = % of Anderson Hispanics Not Disciplined (%A)

# of District Hispanics Not Disciplined / **# of Hispanic District Students** = % of District Hispanics Not Disciplined (%B)

Difference from District = %A-%B

13

Attachment 3 is a set of notes and definitions for the Profile. Pages 3 and 5 of Attachment 3 provide definitions of population and group percentages. Figures 1 and 2 illustrate and explain the difference between the percentages using retention and discipline as examples. If the number of Hispanic students who were retained at a school is divided by the total number of students at the school who were retained, the result is the percentage of the retainees who were Hispanic, a population percentage. If the number of Hispanic students who were retained at a school is divided by the Hispanic students at the school, the result is the percentage of Hispanic retainees, a group percentage.

Once these concepts were defined, even though production of the Profile was well underway, the executive director instructed that the percentage statistics to be reported be reexamined and the appropriate statistic, properly labeled, be reported. At first it appeared as if the group percentage should be the appropriate statistic to report for all indicators. One reason for its apparent preferability had to do again with meaning. With a population percentage, because both the totals for a school and for the District ("all students") are 100%, the "difference from the District" is always zero and therefore meaningless. This peculiarity notwithstanding, on second examination the indicator "student demographics" proved to be an important instance in which population percentage was the more appropriate statistic. When considering the percentages of males and females or the percentages of Hispanic, Black, and Other students in a school, the user of a profile expects the subgroup percentages to add up to 100. Hence, both group and population percentages were included in the Profile.

Programming the Profile

A group of nine AISD programmers was assigned the task of performing the programming necessary to produce the Profile. At a meeting on January 22, 1992, the programmers received the latest draft format for the Profile and a timeline calling for completion of the Profile by February 28. The programmers were assigned either to write data to Megafile from other files or to print the profile pages. One of the Systemwide Evaluation evaluation associates was assigned as interface to the programmers to answer their questions. The team leader was to coordinate the effort, act as arbiter, and create user documentation (see Attachment 3).

Several important guidelines for producing the Profile were enunciated at this meeting:

1. As much as possible, programmers would use data from the Public Education Information Management System (PEIMS) files as the basis for the statistics to be printed in the Profile.
2. "Double bump" when updating information where three years are given, meaning that the most recent year's information should always be stored in the same place—call it position 1—the next most recent in position 2, and the oldest in position 3. Each time a new year's information were added, the previous information would be "bumped"—the new information into position 1, the position 1 information to position 2, position 2 to position 3.
3. All of the printing would be accomplished through programs written with Statistical Analysis System (SAS) software, rather than in COBOL.
4. Zeros (0's) would be loaded into all numeric fields by way of initializing the fields and as placeholders over which actual data would be written.
5. For the sake of uniformity and ease of printing and pagination, every page of the Profile would be printed for each school, even if no information for the school were present—e.g., course grades for an elementary school.
6. Documentation would be placed on line in a common library.

Over the ensuing month, the programmers worked very diligently to bring the Profile to completion. Numerous difficulties (see below) and questions over definitions of variables arose (e.g., see "Population versus Group Percentage") which slowed the effort, and concerns were expressed about meeting the February 28 deadline for producing the Profile. The interface provided by the Systemwide Evaluation evaluation associate and, to some extent, the team leader, which was characterized by a flexibility toward problem solving and a sympathetic understanding of the magnitude of the task given the strict deadline, proved critical to keeping the enterprise underway.

Difficulties in Producing the Profile

Some of the difficulties stemmed from decisions made in the January 22 meeting which had to be reconsidered. Others were rooted in differences in expectations for the final product.

In light of the potential number of blank pages that would be printed, the executive director rescinded the decision to print every page for every school and directed that totally blank pages should be suppressed in the printing. One consequence of this decision was that pagination could no longer be accomplished as simply. The agreed-upon pagination scheme was to print school number-page number (e.g., 002-11), starting over at page 1 for the first page of each school. With a varying number of pages per school, pagination now seemed to require a complicated table lookup, and given the relative unimportance of page numbers compared with the other Profile information to be assembled, the necessity for programmers to print page numbers was questioned. One alternative proposed was to have temporary clerical staff type page numbers on the bottom of the Profile pages when they were printed.

Another issue arose over the decision to write zeros into numeric fields. If actual numbers were not written over the zeros, the zeros rather than blanks would be printed on the Profile pages. The executive director's and team leader's preference was that zeros that did not have any true meaning, i.e., that did not represent a genuine zero quantity of the indicator, be blanked out and not printed. The programming difficulty in accomplishing this, however, was in distinguishing between a true zero and a mere placeholder. Unless someone could make this distinction by inspection beforehand, the programmers were at a loss for a means to ensure that only true zeros would be printed.

Another printing issue not completely resolved was the orientation of the Profile pages. The executive director's preference was for all pages to be in the "profile" orientation, the customary book-style layout. The quantity of information to be reported, however, forced an accommodation to the "landscape" orientation for some pages. Turning pages sideways had the consequence, in turn, of altering the location where the page number was printed from the bottom center to the center of the right margin, an undesired nonuniformity.

A follow-up meeting on February 24 resolved most of these issues:

1. Three patterns of Profile pages were to be printed, one each for schools with grades K-6, grades 6-8, and grades 9-12. These patterns could be identified beforehand, and pages could be paginated appropriately. Some blank pages would be printed, e.g., test scores for grade 6 for elementary schools which did not have a sixth grade, but fewer blank pages would be printed than if one pattern were employed, i.e., print every page for every school.

2. Page numbers would be printed by programmers in the school number-page number format, rather than typed onto Profile pages after printing.

3. Page numbers would be printed at the right-hand margin on landscape pages but, in future Profile runs, placed at the bottom center.

Despite these difficulties, **the Profile was printed on schedule** the weekend of February 28, 1992, and after internal review was copied and disseminated to campuses and administrators the second week of March.

Attachments 4, 5, and 6 are sample profiles for an elementary, middle school, and high school, respectively.

District Profile

In the October 1 meeting, the team decided to place District information on Megafile but not to print it. The hurdle needing to be overcome with the District profile was the format in which it would be printed. Printing "difference from Dist." statistics did not make any sense and argued for redesigning the Profile's format for District statistics. With priority being given to printing the school profiles, and no immediate need for a District profile, printing of the profile was deferred until the next cycle.

Student Profile

Rationale

The individual student profile is the answer to the long-sought, often-requested student information screen, an on-line computer "file" containing comprehensive information—sometimes described as "everything you ever wanted to know"—about a student which could be accessed by personnel on a campus or in administrative offices. Prospective users of the screen wanted to be able to view on-line information about a particular student from interactive disk files maintained on the District's IBM 4381 mainframe without having to terminate access to one file before accessing the next; they wanted, in essence, to be able to "swim" through the files without being encumbered by having to key in file names, the student's identification number, and passwords. Questions of access to confidential information aside, the task of connecting dozens of files was a technically feasible, though laborious, project, which had never received sufficient priority to see it realized—until DISC.

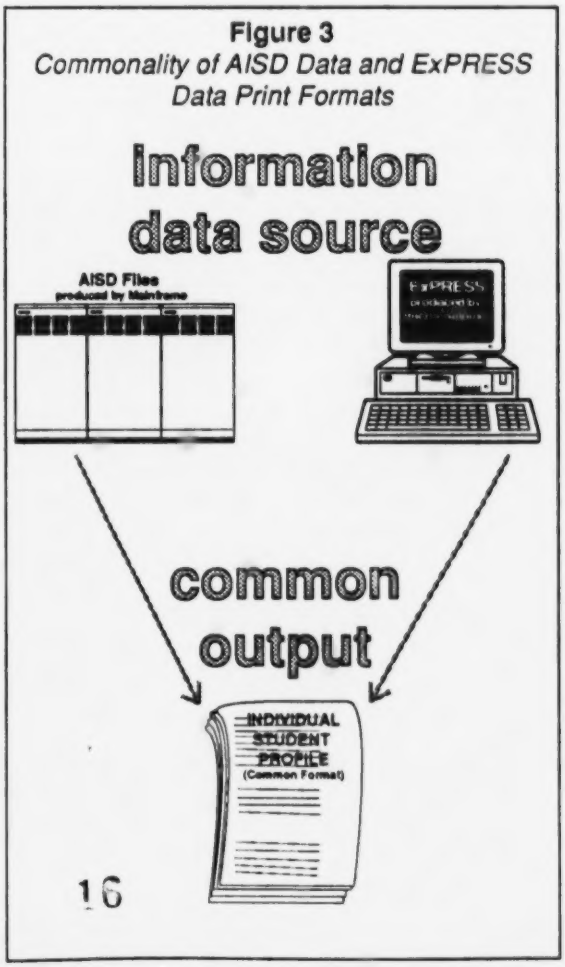
CICS Meets ExPRESS

Initial planning for the student profile by the Systemwide Evaluation evaluator was along the lines of another interactive file—a database customer information control system (CICS) in IBM terminology—with multiple "pages" (screens) containing the desired information through which the user could browse. Similar (though not as extensive) CICS files were already in use in AISD, and another file would merely be a more elaborate version of existing applications. However, the executive director of DMI furnished an alternate vision of the student profile, which grafted the home-grown notion of a student information screen with a national effort for standardizing electronic data exchange. Enter ExPRESS, Exchange of Permanent Records Electronically for Secondary Students.

The executive director envisioned the student profile as the "flip side" of the electronic transfer of student transcripts, from university to university and from school systems to universities. AISD had already, in fact, been successfully transmitting high school student transcripts to The University of Texas at Austin for several years. Now the ExPRESS effort was in need of a print format for hard copy, that is, how the data transmitted electronically would appear when printed on paper. Creating this print format was the first step toward realizing a student profile because a single format could be used both for data extracted from AISD files and for data transmitted to AISD electronically via ExPRESS (see Figure 3). In other words, whatever the source of the information about the student, a hard copy of the student's profile could be printed. The executive director decided against an on-line display file until the system for printing the hard copy student profile could be implemented and the demand for student profile information by campuses evaluated.

Whether the outcome was to be the successful transfer of student data or the production of a student profile from AISD files, the key was programming, as illustrated in Figure 4.

Figure 3
Commonality of AISD Data and ExPRESS Data Print Formats



Designing the Profile

Accordingly, in October 1991, a programmer was assigned to work on the ExPRESS "side" of the project, while the Systemwide Evaluation evaluator set about drafting the print format. Working from an extensive set of ExPRESS specifications, the evaluator was charged with including in the format all of the data elements present either in the ExPRESS specifications or in AISD files and records, which overlapped considerably but not completely (see Figure 5). The resulting seven-page format, completed in mid-November 1991, enabled the programmer to meet a mid-January deadline for completing the programming needed to demonstrate ExPRESS at a nationally attended meeting on February 15, 1992. At this meeting, data were transmitted electronically and were printed out using the AISD-developed print format. (Prior to the meeting, a "dummy" print of a student profile with all of the information shown ran to 25 pages!)

FIGURE 5

Overlap of ExPRESS Specifications and AISD Files and Records

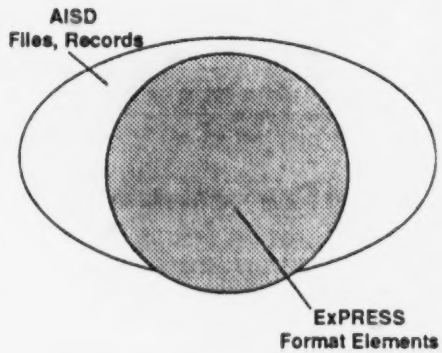
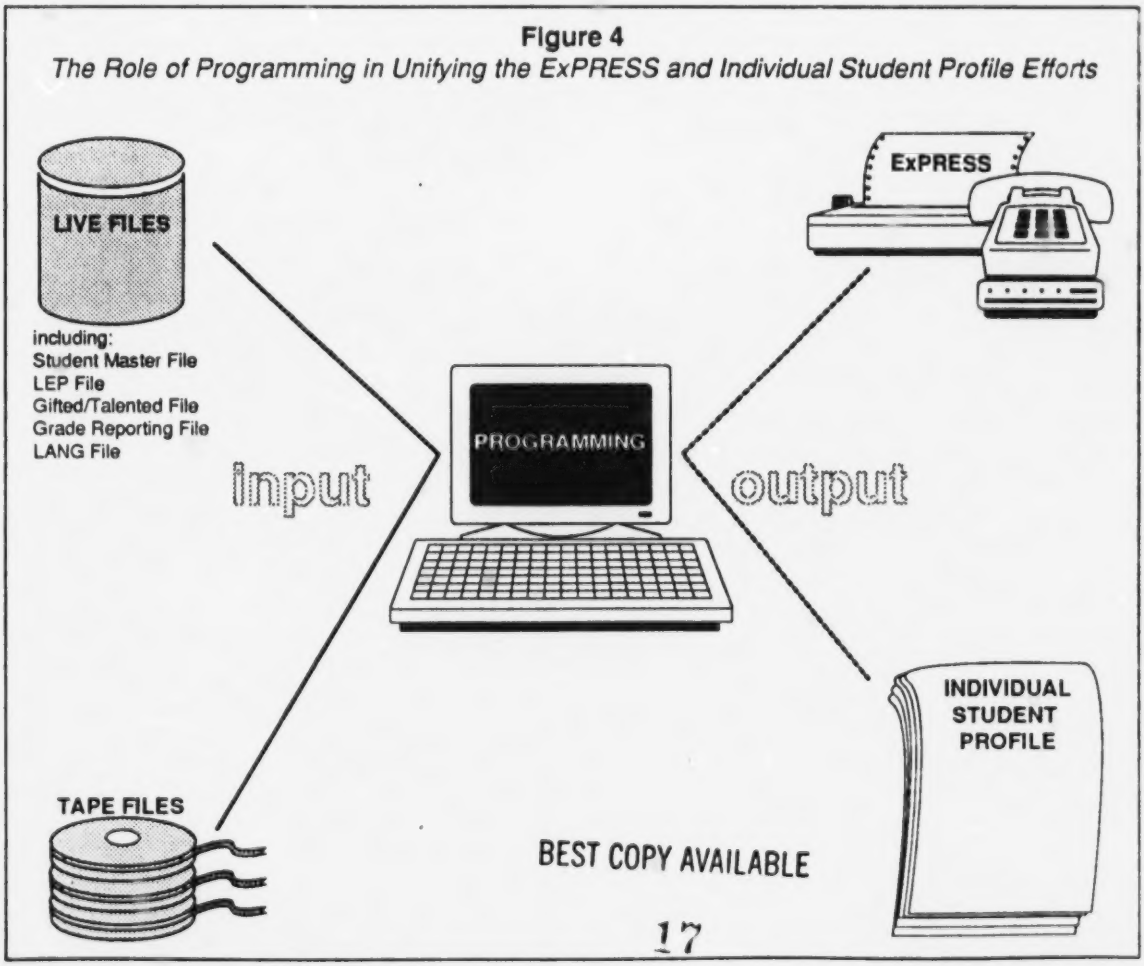


Figure 4

The Role of Programming in Unifying the ExPRESS and Individual Student Profile Efforts



BEST COPY AVAILABLE

To draft the print format, the evaluator examined the displays of 27 extant CICS screens representing student data in the areas of:

- Achievement,
- Attendance,
- Chapter 1 eligibility,
- Demographics,
- Discipline,
- Elementary gifted,
- Family members,
- Grade history,
- Grade reporting,
- Graduates,
- Guidance counseling,
- Home country,
- LEP status,
- Lunch applicants,
- Migrants,
- Special education, and
- Vocational education.

Data elements from these screens and from the ExPRESS specifications were incorporated into a print format which was later elaborated by the programmer, who was able to access the disk source files on which the CICS screens draw.

Programming

In April 1992, after the school profile was completed, work on the student profile resumed. The Systemwide Evaluation evaluator drafted a new timeline for DISC activities which called for putting the individual student profile on line by the end of the school year, June 1. On April 10, 1992, the evaluator drew up a set of specifications for producing the student profile. While the programmer had performed the necessary programming on the ExPRESS side of the project, the programming to access local files had still to be completed. The programming required for creating a student profile was conceptualized in the timeline and the specifications as involving essentially two processes:

- Setting up an on-line mechanism whereby the students for whom a student profile was desired could be designated, and

- Accessing multiple virtual storage access memory (VSAM) files to gather the information to be printed on the profile.

The mechanism for identifying the students was termed the "trigger" and was described in the specifications as "a CICS file into which student ID's are entered, job control language (JCL) is assembled, and the job is entered into the job stream." As outlined in the specifications, when a correct ID is entered from an authorized terminal, VSAM files, i.e., on-line disk files, would be accessed and a profile printed. Programs needed to be written to:

- Create the "trigger,"
- Access VSAM files,
- Interface with the "trigger," and
- Print the individual student profile.

In the interests of time and staff development, the task of creating the "trigger" was assigned to a second programmer, who was furnished with separate, detailed specifications (Attachment 7). The first programmer continued working on programs to extract information from files and to print out the information in the previously devised format. The two programmers collaborated to tie the "trigger" to the file accessing segment.

Both the programming for the "trigger" and the accessing/printing programs (by far the larger task) have been completed. The programmer working on them had to work to knit together several "loose ends" left by the print format since the format reflected the data about a student that it would be desirable to have, whether or not those data currently exist on an accessible file. A sample of the individual student profile is Attachment 8.

At-Risk Status

One of the areas in which new programming was needed was student at-risk status ("at risk" referring to the risk of dropping out of school). The at-risk status of AISD students is saved each year on a computer file, but it was not available on a disk file. For ease of access for the student profile and for other reporting purposes, the evaluator proposed that a position (field) on the Student Master File (SMF) dedicated for use in identifying high-risk

students but not being used be redefined for use in identifying at-risk students. This proposal was implemented in June 1992. The SMF was updated with new information in the newly dedicated at-risk field, specifically, "yes" or "no" (Y/N) or "H" (high risk), based on the codes stored in the 1990-91 at-risk files (elementary and secondary).

Other Programs

Another area of new programming arising from the task of reifying the print format for the student profile concerned "other" programs. Besides reflecting the student's status with respect to participation in special education, bilingual, Chapter 1, Chapter 1 Migrant, or gifted/talented programs, the student profile would ideally indicate whether the student has participated in other types of programs, e.g., dropout prevention, drug prevention, or tutorial programs. At this time, however, information about participation in these programs is not readily accessible. To remedy this deficiency, the evaluator proposed that a disk file be created into which numerous GENESYS files would be loaded (see Attachment 1). The proposed file would contain information for multiple programs for the last three years and would be a ready source of "other" program information for the student profile. The proposal is under study by the programmer supervisor of student applications.

Confidentiality

While creating a student profile which brings together information from numerous central computer files was technically possible, and desirable from the standpoint of potential users of the information, the question of access to confidential student information had to be addressed. Only persons with "legitimate educational interests" (District policy) could have access to individual student information. The same criteria for authorization and access were applied to IPRO, the CICS screen through which the student for whom a profile was needed was designated, as to other CICS screens which displayed confidential test information on-line. According to District policy, only the following administrative and professional personnel are authorized to access on-line computer files of test results:

- Principal,
- Assistant Principal,
- Helping teacher,
- Counselor, and
- Registrar.

Other professional or clerical personnel employed on a campus may be authorized access to on-line computer files of test results at the discretion of the principal, who is responsible for ensuring the confidentiality of the information.

The following persons are not authorized access to on-line computer files of test results:

- Community volunteers
- Students, including aides

At a campus, authorized personnel may look at test results, or request a student profile, only for students in their own school. The student must be shown on the Attendance File as attending that school before the student's records can be accessed.

A number of security precautions already in effect for users of the District's IBM mainframe computer extend to IPRO as well. Users must supply authorized passwords in order to "sign on" to the computer. The passwords themselves determine the level of access to on-line files. Once signed on, all users are presented with a text screen warning them about unauthorized use of the computer and data stored on the computer.

Besides these security measures, two additional levels of security help to ensure the confidentiality of individual information:

1. A screen which appears before the first menu warning the user against improper access, and
2. The requirement of a password to pass beyond the first menu.

Only authorized personnel may receive the password. These personnel must keep the password secure at the risk of losing the authority to access on-line files.

Several other procedures were also devised to protect against unauthorized access to confidential student information:

1. The person requesting a student profile must specify the student by AISD student identification number, which in itself is confidential, rather than by name.
2. The person requesting a profile must supply a name, title, and phone number by typing them onto the IPRO screen.
3. The student ID number and name of each student for whom a request is made for a profile, along with the date of the request, and the name, title, and phone number of the requester are logged by the central computer.

4. The Student Profile Request Log is forwarded to an ORE administrator who monitors the requests for appropriateness.
5. A cover sheet with "confidential" printed large and the name of the requester (but not the student) is placed on top of the printed student profile.
6. The student profile is sent through school mail directly to the requester.

Although all of these procedures do not insure the absolute confidentiality of the information in the student profile, particularly after it is in printed form, they do operate to protect the information from casual disclosure and they emphasize the confidential nature of the information. In the end, as with all confidential student information, the best protection against exposure resides with the responsible use of the information, and secure disposal when no longer needed, by District personnel.

INCREASING DATA ACCESS AND ANALYSIS CAPABILITIES AT THE CAMPUSES

Hardware

Clearly, in order for campuses to become frequent producers of campus-level information, a great deal more computer equipment has to be present on the campuses. Not just any equipment can be purchased, however, without perpetuating the current situation in which neither hardware nor software are standard across the campuses, thwarting attempts to routinize common applications. Attachment 9 (dated August 29, 1991) specifies hardware standards for elementary campuses.

Since fall 1991, there has been a new development which will help guide future expansion of the District's computer capabilities. With guidance and help from IBM staff, DMI staff have been working to plan an AISD Information Systems Architecture (see below).

A budget request for an additional PC and printer for each elementary campus was submitted for inclusion in the proposed 1992-93 budget but was deleted early on in budget deliberations. The School Board did approve a DMI proposal to use available telecommunications and computer maintenance funds to connect elementary schools to the mainframe computer system using the institutional cable network (INET). This connection will give elementary schools the same direct access to the mainframe enjoyed by secondary schools and eliminate the dial-up modems and lines they have been using. Installation of the lines, modems, and CRT terminals will occur in summer 1992, with adjustments to be made on request in fall 1992.

Software

Beta Testing

In addition to hardware, in trying to accomplish the goal of increasing access and analysis of data at the campus level, a careful study of available software and the accompanying hardware it requires is essential. Software publishers are constantly striving to develop products that will be both beneficial and manageable for the end user. In this vein, software publishers have over the years turned to the users for feedback when writing new software or upgrading existing software.

When software development is nearing completion, prospective end users are sought to critique and test the software in a working environment. This process is known within the software industry as beta testing. Throughout beta testing, end users can comment on different aspects of the software's performance. Beta testers are encouraged and expected to:

- Become familiar with and use the program extensively to document any problems or "bugs" that could inhibit the program from running either properly or at all,
- Comment and document likes and dislikes,
- Envisage features that could enhance the use of the product to others, and
- Make remarks on overall value as to how well the software meets its intended need.

Beta testing can be a very worthwhile experience for both parties (software publisher and beta tester). The publisher obtains firsthand knowledge of the worth of the product in a +real world+ environment, whereas the beta tester gets to assist and provide input in the development of new and leading edge technologies.

Test Reporting Management System™ (TRMS™)

In January 1992, the Office of Research and Evaluation consented to participate in a beta testing project for the Psychological Corporation. The software ORE was asked to evaluate was the Test Reporting Management System (TRMS). The entire process took about three months from start to finish.

ORE was asked to document responses throughout the process in the form of responses on questionnaires provided by the publisher. The first questionnaire dealt with initial impressions about the overall packaging of the product, the second, installation and first attempts at using the program. The third and final questionnaire was an in-depth evaluation of TRMS after having used it for several weeks.

Pending an evaluation of the final release of the software, it is not yet possible to make a decision as to its value to the District, but a first impression was that it could be very useful in managing test reporting.

Ready Graphs PLUS

ORE was provided with a working copy of the Ready Graphs PLUS from the Psychological Corporation to review. Ready Graphs is a software product that contains preformatted graphs for an individual school district based on the district's test scores. The charts are easily producible with a minimum amount of work. Although the product was able to provide much useful information well displayed in graphs, it was decided that the District and the campuses would benefit from a program that was more versatile and allowed users more control over the manipulation and presentation of the data.

Management Software

For some time, the executive director has sought some software to aid in planning and managing complex projects—projects like DISC, in fact. Although such traditional planning tools as PERT and GANTT charting are helpful, these techniques lack the utility and versatility of sophisticated software. With an eye toward expediting DISC itself, and another toward finding software which could become standard for the District, members of the DISC team reviewed a promising product by Symantec called On Target. The main drawback of On Target, with respect to becoming a District standard, was that it requires the use of Microsoft Windows, and Microsoft Windows uses more storage space than desired, according to AISD's assistant director for programming.

The executive director purchased and is using Microsoft Project for Windows 3.0. Whether this software will be selected as the standard management software for the District is undetermined. Like On Target, Microsoft Project for Windows uses Microsoft Windows and thus shares that disadvantage.

Simple Applications

Student/Parent Addresses

One of the first-year objectives of the DISC project was to identify and furnish to campuses simple applications which be used immediately. One such application was developed by DMI's Data Processing/Interface office in response to numerous requests from campuses for student mailing labels and rosters of student membership. Although providing this information is not difficult, the volume of requests received disrupted the flow of work on other, larger projects. Therefore, the prospect of decentralizing this process became very attractive not only to central staff but also to local campus staff as well.

To give the schools more direct access to this information, Data Processing/Interface set up a system whereby school staff can request student demographic data for their campus. A data interface person then downloads the information from the mainframe onto a PC diskette. Once the diskette is completed it is sent to the school for its use. Data Interface provides the schools with the raw data only, not the actual software. The schools need to have the software to manipulate the data. Each campus is responsible for investing in the software that best met its needs (database, word processing, specialized label making programs etc.). In this way, all the information is readily available to all campus staff and can be printed locally without having to wait for a printout to be sent through the school mail.

Already-Formatted Data Files

For those campuses where the interest, the software, and the expertise exists to manipulate data provided on diskette, ORE has been furnishing customized files converted into American Standard Code for Information Interchange (ASCII). This practice requires that a programmer perform the file-building operations using the mainframe computer and download the file to diskette. For example, one high school was furnished with a file in ASCII containing the names of its students, their ethnicities, parents' names, and telephone numbers (information not routinely available from Data Interface). Using its own software, the school can manipulate the coded data to create a school directory, mailing labels, etc.

The Longhorn Project

In fall 1991, members of the DISC team reviewed The Longhorn Project in Chemistry for possible implementation in District high schools. The Longhorn Project, developed by faculty members at The University of Texas at Austin (the "Longhorns"), is an integrated, computerized system which generates, and machine scores, sets of homework assignments, tests, and examinations individualized for each student. The system utilizes an extensive database of chemistry questions, organized by concepts, that has been developed over the past 10 years by UT's Chemistry faculty members for their own use. After being field tested at Anderson High School during the spring 1991 semester, The Longhorn Project was offered to the District as a subscription service. However, the cost of the services—$1 per week per student, totaling $5,400 for 150 students per school year, plus the cost of courier service between UT and high school campuses for pickup and delivery of printouts—was too expensive for Districtwide implementation. Nonetheless, this computerized system, which has the potential for saving teachers time and reducing their paperwork, while increasing individualized instruction, is the sort of automated application which needs to be fostered within AISD at the campus level.

Staff Training

Although the importance of training has been reaffirmed in discussions with administrators, training for staff remains a goal for the second year of the DISC project.

Support Personnel

Consideration of what support services are needed and which personnel would provide them remains to be addressed in the second year of the DISC project.

DIRECTIONS FOR THE FUTURE

Information Systems Architecture (ISA)

The path by which the second goal of the DISC project, that of increasing the data access and capabilities at the campuses, will be realized is via a districtwide plan for technology and information management.

In April 1992, the Austin Independent School District began work on a project with districtwide ramifications in technology known as Information Systems Architecture (ISA). The planning and building of this architecture was overseen and directed by IBM Information Systems Architecture specialists in partnership with AISD staff. Funding for this endeavor was supplemented by Project A+.

AISD's ISA specifies standards and principles upon which technology projects, packages, and future applications will be based. The idea is that in the future, when someone in AISD has a project or purchase to make, the question that must be answered is, "Will this function within AISD's overall technology architecture?".

AISD's objectives for creating the Information Systems Architecture are as follows:

1. Create an architecture which can be used by instructional environments, campus management, and central support services to guide the design of systems and the selection and deployment of Information Technology assets.

2. Establish standards to be followed.

3. Establish clear performance levels for Information Technology systems.

4. Document architectural principles used to guide Information Technology decisions.

5. Minimize politics associated with isolated decision making.

6. Document a technology strategy.
7. Summarize the current Information Systems environment.
8. Establish a computing model for schools.
9. Establish criteria for selecting products, removing the burden from non Information Technology literate personnel.

More information about AISD's ISA may be found in Information Systems Architecture for the Austin Independent School District.

Clearly, AISD's Information Systems Architecture blends with the goal of the DISC project, to increase data access at the campuses while providing the capability to analyze the data. By allowing the Information Systems Architecture to be fully implemented, the District is assured of a uniform structure and development of information technologies. The ISA insures that all technologies within the District, both present and future, will be compatible and workable. The DISC project then has only to work within the ISA structure, and by tapping into the resources and information already collected and reported by the ISA can attain its goal.

CONCLUSIONS

After the first year of the project, it is reasonable to ask, "How far along are we?" How much progress has been made in realizing the goals and objectives of the DISC project? The answer, basically, is that we have taken a good first step. School profiles have been redesigned and consolidated. A new student profile is on-line and being used. Simple applications have been placed in the hands of users, and some important software has been reviewed and tested. Finally, an architecture is being developed which will provide the framework for realizing more of the goals of the project.

Reaction from the field, from campus staff and others, has been generally positive. Many information needs have been met by directing persons with queries to the Profile. One persistent request, toward which efforts are now underway, is for a shorter version of the Profile, one which, as one central administrator so blithely put it, would contain "just the important information." The problem of defining what that was for all audiences did not phase him. Nonetheless, the notion of an "executive summary" to the Profile has merit. Disaggregation of the data by ethnicity has proven useful, but because of requests for information about Asian students, future Profiles will break down data by five ethnic groups instead of three. A central user of the individual student profile has made suggestions for additions, and specifications will soon be drawn up for a programmer. Two high schools believe they have the computer hardware, software, and trained personnel to begin receiving data sets on diskette, and a programmer is readying a database.

The first step has been a good one, but it is only a first step, and many other things need to occur to provide better end user computing services, to implement new tools, techniques, and processes that allow users to access and use information, and to develop and use information bases of their own. More hardware needs to be acquired, more software as well, and staff training and support will need extensive investment. With continued effort and user interest, we can go where no profile has gone before.

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DEFINITIONS

Some definitions provided are from or adapted from:

Blissmer, R. H., & Alden, R. H. (1989). Working with computers. Dallas: Houghton Mifflin Company.

Application. A particular task for which a computer program is written.

Byte. A unit of storage that can hold one character of information. A kilobyte is 1,000 bytes.

CICS. Customer information control system. IBM terminology for an on-line disk file which allows the user to seek, and sometimes change, information.

COBOL. Common business oriented language. A standardized business language for programming a computer.

Data. The raw facts that are used to create information.

Database. A collection of various categories data, organized according to a logical structure.

Desktop publishing. The use of personal computers and page composition software to prepare and print typeset- or near-typeset-quality documents.

Disk. An information-storage device. A disk is a random access medium, which means that information can be retrieved from any part of it without having to "read" through it from the beginning, as is required with magnetic tape.

Distributed processing. Information processing distributed among physically separate computer systems.

File. A collection of logically related information.

Format. The way information is physically organized on a display screen, printed page, or disk.

Hard copy. Printed on paper.

Hardware. The electronic and mechanical components of a computer system.

Information. Data organized such that they can be used in decision making.

JCL. Job control language. IBM terminology for the commands a programmer gives a computer to have it operate. Separate from the commands in a computer program.

Laser printer. A printer that creates better than letter-quality printing.

Mainframe. Room-sized, high performance computers, capable of running complex programs that would be impractical or impossible on smaller computers.

MIS. Management information system. The use of computers and other systems to generate the information necessary for management to perform its major functions: planning, organizing, directing, and controlling.

On-line system. A system in which input is transmitted immediately from the point of origin to a central location for processing.

Query. A question or request for information.

Software. The programs that control the operation of a computer.

Template. A partially completed worksheet containing text and formulas but not data.

Utilities. Programs that perform functions required by many of the application programs using the system; for example, utilities can copy, rename, and delete files.

VSAM. Virtual storage access memory. VSAM files are on-line disk files.

ATTACHMENTS

Attachment 1: Description of Profiles Before DISC

Attachment 2: File Format for Megafile

Attachment 3: Profile Notes and Definitions

Attachment 4: Sample Elementary School Profile

Attachment 5: Sample Middle School Profile

Attachment 6: Sample High School Profile

Attachment 7: Specifications for the CICS "Trigger"

Attachment 8: Sample Individual Student Profile

Attachment 9: Hardware Specifications for Elementary Campuses

Attachments 2-9 are available on request from the Office of Research and Evaluation, 1111 West 6th, Austin, TX 78703-5399, (512) 499-1724, FAX (512) 480-9595.

ATTACHMENT 1

DESCRIPTION OF AISD PROFILES BEFORE DISC

Academic Excellence Indicator System (AEIS): AEIS, the result of a mandate from the Texas Legislature calling for a comparison of "the performance of each campus to the performance of campuses with similar wealth and demographics," is a set of indicators of the quality of learning on a campus and other performance standards. Every year, campuses receive performance evaluations from the Texas Education Agency (TEA). Each report contains two ratings. One rating reflects the performance of students at the campus against the performance of students in the 100 campuses in the state most demographically similar to it; the other rating reflects the performance of students at the campus against state standards.

The eight AEIS indicators are:

- Texas Assessment of Academic Skills (TAAS) performance,
- Percent student attendance,
- Dropout rate,
- Enrollment in advanced courses,
- Expected graduation rate,
- Percent graduates to receive advanced seal on transcript,
- College admissions tests,
- Percent of students passing all portions of the Texas Academic Skills, and Program (TASP) on first attempt.

Achievement Profiles: AISD's Achievement Profiles contain summary data for the achievement tests, both criterion- and norm-referenced, administered in the District over the previous five years. Norm-referenced test data are disaggregated by school, and within school by grade; within grade, data are broken down by test for the total group and for each ethnicity. Median percentile rank and median grade equivalent (GE) scores are reported for each subgroup. For the total group, percentages of students scoring in various percentile ranges and percentages of students scoring at least plus or minus 1.0 GE from grade level are presented. Criterion-referenced test results are shown in terms of the percentage of students at each school mastering each test objective and the percentage of students mastering each subject area. Demographic summaries present the percentage of students mastering each subject area by subgroup.

Annual Performance Report (APR): Conceptualized as a "report to the stockholders," the APR is an outgrowth of Texas' education reforms of the mid-1980s. The 1990-91 school year report was the seventh and last APR to be prepared. Changes from the Legislature and TEA have substituted the AEIS as the mandated report from all school districts in the State and require that it be used as formatted and printed by TEA. In the future, therefore, the AEIS Report will constitute the APR, and a Profile containing other information useful for schools staff will be produced (the Profile created as part of DISC). The Profile incorporates all of the information contained in the APR and uses some of the same format and "template" technology for the first page.

Effective Schools Standards Report (ESSR): In 1987-88, the principals of AISD's Priority Schools worked with ORE to develop common standards which describe an effective school. Standards were developed for:

- Student attendance,
- Staff attendance,
- Statewide test performance,
- Local test performance, and
- Parent evaluation.

The ESSR reports how well each school has met the effective school standards and whether the school is "improving" based on student performance on the statewide test. Because it contains almost all of the same information, the Profile is intended to replace the ESSR.

GENeric Evaluation SYStem (GENESYS): GENESYS is a method of streamlining data collection and evaluation through the use of computer technology. By gathering information from AISD's extensive data bases, GENESYS reports the following standard information on any specified group of students:

- Student characteristics,
- Achievement,
- Attendance,
- Discipline,
- Grades/credits,
- Dropouts, and
- Retainees.

GENESYS has been used to produce a report on all of the District's schools, but with the advent of the DISC Profile, it will no longer be necessary to do so.

School Characteristics and Ranks (SCAR): More than five years ago, in response to the need for comparative school information on a wider range of indicators than achievement alone, ORE developed an on-line computer file and accompanying reports which ranked schools on variables such as pupil-teacher ratio, students promoted, students attending college, and many others. In order that rankings be unidimensional, variables were selected which correlated positively with performance on standardized tests, which sometimes led to less-conventional phrasing, e.g., students not in special education. As an on-line file, SCAR was an early forerunner of Megafile, which is intended eventually to be available for viewing on-line at the campuses. SCAR was updated twice annually, in the fall and in the spring when data became available, so that the data displayed on screen was always the latest available. Each variable was reported with the year or semester and year it represented, so that the user knew the "as of" date, a practice carried forward into the Profile.

Secondary Profile: During the 1990-91 school year, at the request of the Division of Secondary Education, ORE produced a Secondary Profile which presented five years of data for each high school and middle/junior high school campus on the following variables:

- Texas Educational Assessment of Minimum Skills (TEAMS),
- Iowa Tests of Basic Skills (ITBS),
- Student attendance,
- Staff morale,
- School climate,
- Parent satisfaction,
- Discipline,
- Dropout rate, and
- Passing grades.

The DISC Profile replaces the Secondary Profile.

Vital Signs: Over a five-year period (1986-87 through 1990-91), the superintendent's Cabinet reviewed selected management statistics on a six-weeks basis. The superintendent requested that staff develop a straightforward method for displaying the statistics to facilitate the tracking of trends. The method developed was a multicolored chart which presented graphically these key management statistics:

- Attendance,
- Discipline,
- Grades,
- Nondropouts, and
- Exit-Level TEAMS/TAAS.

Vital Signs ceased to be produced in 1991-92 and is replaced by the Profile.

Samples of all of these profile reports are available on request from ORE.

Handout for: Distributive Information Systems for Campuses (DISC): Going Where No Profile Has Gone Before, Wilkinson, Spano, Meyer, AERA, April 14, 1993

TIMELINE OF KEY DECISIONS

DATE	ISSUE	DECISION
September 1991	"Periodicity" of the Profile	Create a single, printed profile with cells completed as data become available--whenever profile is printed, available data are entered, other cells blank.
September 1991	Medium of the Profile	Hard copy. Explore other media in the future, beginning with on-line, interactive.
September 1991	Guidelines for the Profile	• Disaggregate • Include statistics not on any existing profile • Give #'s and %'s • Give a 2-, 3-, or 5-year historical perspective • Compare each campus to District totals
September 1991	Features of the Profile	• Available on request • Most current data • Meaningful and useful to somebody (as many as possible) • Disaggregated information • Positively stated indices, e.g., promoted instead of retained • Glossary, index, table of contents, definitions, formulas, examples • Appropriate comparisons/valid rankings
September 1991	Outside review	Review after the design stage by knowledgeable users, both individuals and existing advisory committees with broad-based representation.
September 1991	Format of the Profile	Hierarchical: area, indicator, subindicator, group, subgroup, statistic

TIMELINE OF KEY DECISIONS (cont.)

DATE	ISSUE	DECISION
September 1991	Length of the Profile	As many pages as needed no matter how long
September 1991	Rankings	Do not rank campuses according to statistics such as dropout rate, etc.
October 1, 1991	Major sections of the Profile	• School Description • Student Information • Staff Information • Finance Information
October 1, 1991	Comparative statistics--District, state, national	Print only a school's differences from them. Do not print a District profile.
January 1992	Printing the Profile	Programmers write print statements dictating the printing of the output; print on 8 1/2 x 11 inch pages using the mainframe laser printer
January 1992	The Profile file	Create a single disk file containing all of the data needed to print the Profile--"Megafile"
January 8, 1992	Definition of "all students"	For "all students" (total), the percentage should be 100%, and percentages within subgroups should sum to 100.
January 1992	Population vs. group percentage	Rescind earlier decision to have subgroups sum to 100%. Define two types of percentages. Report appropriate percentage statistic for each indicator.
January 22, 1992	Programming the Profile	• Use data from files created for state-mandated reporting. • "Double bump" when updating information where three years are given. • Write print programs in SAS. • Initialize numeric fields with 0's. • Print every page of the Profile for each school, even if no information for a school is present. • Document in an on-line, common library.

TIMELINE OF KEY DECISIONS (cont.)

February 24, 1992	Printing blank pages	Rescind earlier decision to print every page for every school. Print three patterns of Profiles, one each for schools with grades K-6, 6-8, and 9-12. Print some blank pages where the data do not exist, but fewer than would be printed if only one pattern were used.
February 24, 1992	Page numbers	Print school number-page number (e.g., 002-11), starting over at page 1 for the first page of each school.
February 24, 1992	Orientation of the printed Profile pages	While "profile" orientation preferred, print some pages "landscape." On landscape pages, print page number at the right-hand margin instead of bottom center.
February 1992	Writing 0's into numeric fields	Do not print zeros that did not have any meaning, i.e., represent a genuine zero quantity of an indicator. Identify beforehand and inform programmer.
February 1992	Documenting	Write separate document, "Notes and Definitions," and disseminate with Profile.
August 25, 1992	Printing a District Profile	Print Profiles for each of five administrative areas and for the District according to grade span, one for each area and the District for grades K-6, 6-8, and 9-12--18 Profiles in all.
December 1992	Footnotes	Include footnotes defining variables on Profile pages.
January 1993	Executive Summary for Profile	Create 2-page Executive Summary for Profile using District's previous Annual Performance Report as model. Replace previous first page. Print each time Profile is printed.

Handout for: Distributive Information Systems for Campuses (DISC): Going Where No Profile Has Gone Before, Wilkinson, Spano, Meyer, AERA, April 14, 1993

OVERVIEW

PURPOSE (MISSION) OF PROJECT: To empower campuses to access and use information for decision making more effectively

GOALS OF THE PROJECT:

1. To redesign student, school, program, and districtwide profiles, and

2. To increase data access and analysis capabilities at the campuses

FIRST-YEAR OBJECTIVES OF PROJECT:

- Identify software campuses can use
- Redesign profiles
- Redesign applications
- Increase data access at the campuses

PERSONNEL (THE DISC TEAM):

Administrator (team leader)	25%
Administrator	15%
Professional	25%
Professional	75%
Professional	15%
Programmer (supervisor)	15%
Programmers (7)	varied

OVERVIEW (cont.)

PREREQUISITES FOR PROJECT:

- IBM 4381 mainframe
- Statistical Analysis System (SAS) on-line
- COBOL
- Mainframe laser printer
- Multiple student and other data files

TIME FOR PROJECT: 5 MONTHS (first phase only)

COST OF PROJECT: $48,569 (first year only)

METHOD:

- Design Profile
- Write custom software in COBOL and SAS to extract student, staff, and financial data from centrally maintained District files and store on single, "Megafile"
- Print Profile for each campus, area, District

RESULTS OF PROJECT:

- Consolidated profile with "all" information needed for campus planning and other needs
- Individual student profile requested on-line
- Simple applications furnished to schools
- Progress made toward moving data to campuses